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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,896	08/20/2001	Michael Leon Kazar	SPIN-3	8068

7590 06/16/2005

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Pittsburgh, PA 15213

EXAMINER

THOMAS, SHANE M

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 06/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/932,896

Applicant(s)

KAZAR, MICHAEL LEON

Examiner

Shane M. Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-25 is/are allowed.
- 6) ☒ Claim(s) 1 and 3-9 is/are rejected.
- 7) ☒ Claim(s) 10-16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

pd

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/24/2005 has been entered.

This Office action is responsive to the Request for Continued Examination filed 5/24/2005. Claims 1 and 3-25 are presented for examination. Claim 2 has been canceled.

All previously outstanding objections and rejections to the Applicant's disclosure and claims not contained in this Action have been respectfully withdrawn by the Examiner hereto.

The examiner requests, in response to this Office action, any reference(s) known to qualify as prior art under 35 U.S.C. sections 102 or 103 with respect to the invention as defined by the independent and dependent claims. That is, any prior art (including any products for sale) similar to the claimed invention that could reasonably be used in a 102 or 103 rejection. This request does not require applicant to perform a search. This request is not intended to interfere with or go beyond that required under 37 C.F.R. 1.56 or 1.105.

The request may be fulfilled by asking the attorney(s) of record handling prosecution and the inventor(s)/assignee for references qualifying as prior art. A simple statement that the query has been made and no prior art found is sufficient to fulfill the request. Otherwise, the fee and

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certification requirements of 37 CFR section 1.97 are waived for those documents submitted in reply to this request. This waiver extends only to those documents within the scope of this request that are included in the application's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this request and any information disclosures beyond the scope of this are subject to the fee and certification requirements of 37 CFR section 1.97.

In the event prior art documentation is submitted, a discussion of relevant passages, figs. etc. with respect to the claims is requested. The examiner is looking for specific references to 102/103 prior art that identify independent and dependent claim limitations. Since applicant is most knowledgeable of the present invention and submitted art, his/her discussion of the reference(s) with respect to the instant claims is essential. **A response to this inquiry is greatly appreciated.**

The examiner also requests, in response to this Office action, that support be shown for language added to any original claims on amendment and any new claims. That is, indicate support for newly added claim language by specifically pointing to page(s) and line no(s). in the specification and/or drawing figure(s). This will assist the examiner in prosecuting the application.

Response to Amendment

As per Applicant's amendment to claims 1 and 7, the Examiner has cited Palmer (U.S. Patent No. 6,748,438) and Frank et al. (U.S. Patent No. 6,871,222). Palmer teaches a disk

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arbitration mechanism for electing a primary server for arbitrating access to shared storage.

Frank teaches a cluster management system utilizing a plurality of stored storage devices.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claim 5, the term --state-- is vague and open to multiple interpretations. Referring to the Applicant's specification, page 5, lines 9-15, discusses a server's heartbeat counter changing - not the state of the server itself. It appears to the Examiner that the term --state-- is regarding the operability (i.e. online or off-line) of a server. As such, the scope of the claim is not apparent in that it is not clear whether a --change of state-- is referring to a particular server being operable or if the --change-- is to the heartbeat counter of the server. Nonetheless, for the purposes of examination, the Examiner shall interpret a server's state change to be whether the server is operable and the --value associated with the state when it last changed-- to be the value of the heartbeat counter. Clarification is requested.

As per claim 6, the claim is rejected as being dependent on rejected claim 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,3,4, and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Palmer et al. (U.S. Patent No. 6,748,438).

As per claim 1, Palmer shows a plurality of servers (602,603,604, and 605) in figure 6 and a disk 608 that has a reserved disk block 612A-D for each of the servers (column 12, lines 6-8). Each server is in communication with the disk as shown by connections 614-617. The shared storage disk 608 utilizes a disk arbitration mechanism (figure 10) that uses a timestamp based voting algorithm via the invocation counters of the servers (602B, 611) and the disk blocks 612A-D. In order for the shared storage to elect a primary server, the server must be part of the shared storage's membership view by subscribing to the shared storage (via the protocol of figure 7). Thus the servers indirectly --vote-- for control of the shared storage 608 by being part of the member view of the shared storage. The shared storage 608 chooses a primary server (referred to as the leader) in step 1006 of figure 10. Once elected, the leader server controls all accesses to the shared storage 608 (column 19, line 61 - column 20, line 4). The set of disk blocks 612A-D are used as a communication mechanism between the servers and the shared storage 608 during the membership subscription process of figure 7.

Palmer discloses the claimed invention except for where the number of shared storage disks is more than one. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilized multiple shared storage disks 608, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. Refer to MPEP 2144.04 (vi)(b). With a duplication of shared storage of modified Palmer, the duplicate shared storage would have operated identically to that of the shared storage device 608 - receiving membership subscriptions (figure 7) and choosing a primary (leader) server to arbitrate access of the servers. In this case, the Examiner is regarding one shared storage disk to be a "set of disks" of --the D disks-- since one is a subset of a plurality. Thus it would have been seen that merely duplicating the number of shared storage disks 608 of Palmer would have produced no new or unexpected result.

As per claim 3, Palmer shows in figure 6 that each server has an index. (N1-N4). For example, server 602 has an index of '1.' See also column 18, lines 9-29.

As per claim 4, Palmer teaches in column 18, lines 40-63, that the disk arbitration mechanism (membership protocol) may at predetermined times (i.e. when the appropriate function is called) allow a server to read all of the disk blocks 612A-612D. The disk arbitration mechanism also requires that the servers write their own disk block 612A-612D to determine who will be a member for the shared storage 608 and ultimately, for who will be the leader (primary) server. The writing of the subscription to the disk block and the read of the other servers who have subscribed (i.e. the data blocks) occurs in step 707 of figure 7. Refer to column 13, lines 13-18.

As per claim 7, the rejection follows the rejection of claims 1 and 4. Each server reads the disk blocks in step 707 to determine which servers are subscribed to the shared storage device 608. The timestamp-based voting algorithm for choosing a primary server and the primary server arbitrating access of the disks was discussed in the rejection of claim 1 above. Further, the discussion regarding the disk blocks being used as a communication medium is also found in the rejection for claim 1.

As per claim 8, step 1002 of figure 10 shows the invocation of a membership protocol (figure 7). The Examiner is considering the step of --voting protocol-- to be figure 10 and as such, during the membership protocol of step 1002, the step 707 of figure 7 occurs when active nodes (servers) are joining the membership for access to the shared storage 608. Thus the reading step 707 occurs during the voting protocol.

As per claim 9, a winning server is chosen in step 1006. Once chosen, the winning server has access to, and use and control of the disk that the given time as well as may access the disk exclusively. Refer to column 19, lines 61-67.

Claims 1,3,4, and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Palmer et al. (U.S. Patent No. 6,748,438) in view of Frank et al. (U.S. Patent No. 6,871,222)

As per claim 1, Palmer shows a plurality of servers (602,603,604, and 605) in figure 6 and a disk 608 that has a reserved disk block 612A-D for each of the servers (column 12, lines 6-8). Each server is in communication with the disk as shown by connections 614-617. The shared storage disk 608 utilizes a disk arbitration mechanism (figure 10) that uses a timestamp based voting algorithm via the invocation counters of the servers (602B, 611) and the disk blocks 612A-D. In order for the shared storage to elect a primary server, the server must be part of the shared storage's membership view by subscribing to the shared storage (via the protocol of figure 7). Thus the servers indirectly --vote-- for control of the shared storage 608 by being part of the member view of the shared storage. The shared storage 608 chooses a primary server (referred to as the leader) in step 1006 of figure 10. Once elected, the leader server controls all accesses to the shared storage 608 (column 19, line 61 - column 20, line 4). The set of disk blocks 612A-D are used as a communication mechanism between the servers and the shared storage 608 during the membership subscription process of figure 7.

Palmer does not explicitly teach shared storage 608 comprising multiple disks (D disks where D is greater than one). Frank shows a server cluster system that comprises shared storage (figure 1), and teaches in column 3, lines 44-54, that the shared storage may comprise multiple storage devices with each device comprising header 25 information including data indicating the identity of all devices accessing the shareable storage 22. Therefore, it would have been obvious

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to one having ordinary skill in the art at the time the invention was made to have combined the voting protocol and shared storage management system of Palmer with the teaching of utilizing multiple shared storage devices of Frank in order to have been able to increase the amount of shared storage in the system of Palmer. Thus the system of modified Palmer would have been able to shared more data amongst servers 602-605. The Examiner is considering the header information of the multiple shared storage devices of Frank to be the membership area information - 612, 612A-612E, 611, and 650 - of the shared storage 608 of Palmer.

As per claim 3, Palmer shows in figure 6 that each server has an index. (N1-N4). For example, server 602 has and index of '1.' See also column 18, lines 9-29.

As per claim 4, Palmer teaches in column 18, lines 40-63, that the disk arbitration mechanism (membership protocol) may at predetermined times (i.e. when the appropriate function is called) allow a server to read all of the disk blocks 612A-612D. The disk arbitration mechanism also requires that the servers write their own disk block 612A-612D to determine who will be a member for the shared storage 608 and ultimately, for who will be the leader (primary) server. The writing of the subscription to the disk block and the read of the other servers who have subscribed (i.e. the data blocks) occurs in step 707 of figure 7. Refer to column 13, lines 13-18.

As per claim 7, the rejection follows the rejection of claims 1 and 4. Each server reads the disk blocks in step 707 to determine which servers are subscribed to the shared storage device 608. The timestamp-based voting algorithm for choosing a primary server and the primary server arbitrating access of the disks was discussed in the rejection of claim 1 above.

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Further, the discussion regarding the disk blocks being used as a communication medium is also found in the rejection for claim 1.

As per claim 8, step 1002 of figure 10 shows the invocation of a membership protocol (figure 7). The Examiner is considering the step of --voting protocol-- to be figure 10 and as such, during the membership protocol of step 1002, the step 707 of figure 7 occurs when active nodes (servers) are joining the membership for access to the shared storage 608. Thus the reading step 707 occurs during the voting protocol.

As per claim 9, a winning server is chosen in step 1006. Once chosen, the winning server has access to, and use and control of the disk that the given time as well as may access the disk exclusively. Refer to column 19, lines 61-67.

Allowable Subject Matter

Claims 5 and 6 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 10-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 17-25 are allowable over the prior art of record as previously indicated.

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Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

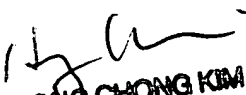
Snaman, Jr. et al. (U.S. Patent No. 6,243,744) teaches servers writing votes for a primary server to a quorum disk. See figures 4A-4G.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane M. Thomas whose telephone number is (571) 272-4188. The examiner can normally be reached on M-F 8:30 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt M. Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Shane M. Thomas


HONG CHONG KIM
PRIMARY EXAMINER

